

**REMARKS**

Claims 1-2 and 4-37 are pending in the present application.

Applicant acknowledges that prosecution of the present application has been re-opened. New grounds of rejection for claims 1, 2, & 4-37 have been asserted by Examiner. Applicant is hereby filing a reply under 37 C.F.R. 1.111 in response to the Office Action dated April 5, 2005.

The Examiner rejected claims 1, 2 and 4-7 under 35 U.S.C. § 103(a) as being unpatentable over *Kleinknecht* (U.S. Patent No. 4,188,123), in view of *Kotani* (U.S. Patent No. 5,105,362). Applicant respectfully traverses this rejection.

Applicant respectfully asserts that all the elements of independent claim 1 are not anticipated or made obvious by the combination of *Kotani* and *Kleinknecht*. Claim 1 calls for illuminating a plurality of implant regions with a light source in a scatterometry tool. Claim 1 also calls for generating a trace profile corresponding to an implant profile of the illuminated implant regions and creating a library using the plurality of calculated trace profiles of the implant region having various implant profiles. An example of the calculated profile traces includes the utilization of Maxwell's equation and rigorous coupled wave analysis (RCWA) for determining a variety of possible combinations of implant profiles readily anticipated by the design process. See, page 10 of the Specification. Neither *Kleinknecht* nor *Kotani* disclose or make obvious the entirety of the elements of claim 1 of the present invention. For example, none of the cited art, either in combination or alone, anticipates or makes obvious the element of creating a library comprised of a plurality of calculated trace profile of implant regions having varying implant profiles, as called for by claim 1 of the present invention.

In the Office Action dated April 5, 2005, the Examiner argued that the database 15 of Figure 1 in *Kotani* discloses the library of claim 1, which comprises a plurality of calculated trace profiles of implant regions having varying profiles. The Examiner supports this assertion by indicating that it would have been obvious to one of ordinary skill in the art to combine the device of *Kleinknecht* with the database 15 of *Kotani* to provide the library called for by claim 1 of the present invention. See paragraph 3, page 3 of the Office Action dated April 5, 2005. The Examiner relies heavily on the disclosure in *Kotani*, which discloses that a data accumulation area or means (i.e., the second block 20) accumulates and stores various data that has been acquired over a long period of time. This data includes results of processes or inspections conducted in the production of line 1 and/or data obtained through various tests conducted by external evaluation systems, which is not shown in *Kotani*. See col. 3, line 57 through col. 4, line 5. This data, as exemplified by *Kotani*, may include wafer test, final production test, reliability test, etc. *Id.* However, *Kotani* clearly does not disclose or suggest creating a library or any database comprised of a plurality of calculated trace profiles of implant regions having varying implant profiles.

In order to address the deficit of *Kotani*, the Examiner uses *Kleinknecht* to argue obviousness of the claim 1 element of creating a library of a plurality of calculated trace profiles of implant regions having varying implant profiles. The Examiner supports this argument by citing col. 4, lines 33-47 of *Kleinknecht*. *Kleinknecht* discloses using various wavelengths of reflected light to yield information about the depth profile of doping of a region between .03 and .5 micrometers from the surface of a processed wafer. *Kleinknecht* merely discloses the depth profile relating to various wavelengths that are measured. See, col. 3, lines 43-54. However, *Kleinknecht* does not suggest creating a library of trace profiles of implant regions. The

Examiner attempts to utilize the disclosure of depth profile measurements using wavelengths in *Kleinknecht*, along with the general database disclosure relating to wafer test results of *Kotani*, to make obvious the element of creating a library comprised of a plurality of calculated trace profiles of the implant regions having varying implant profiles. One of the flaws of this argument includes the fact that *Kleinknecht* does not disclose creating trace profiles relating to a plurality of implant regions having varying implant profiles. *Kleinknecht* does not disclose generating trace profiles of implant regions having varying implant profiles. *Kotani* also does not disclose creating a library or database of calculated trace profiles; it merely discloses a general database and includes wafer tests, results final product reliability tests, etc. Therefore, those skilled in the art would not combine the disclosures of *Kleinknecht* and *Kotani* to make obvious the creating of a library of calculated trace profiles implant regions having varying implant profiles, as called for by claim 1 of the present invention.

The Examiner is unable to point to the prior art disclosure to make obvious this element of claim 1. Using improper hindsight reasoning, the Examiner uses portions of *Kotani* and *Kleinknecht* to piece together disparate bits of subject matter to assert obviousness of the element of creating a library of a plurality of calculated trace profiles. However, the prior art fails to provide motivation to modify either *Kotani* or *Kleinknecht* to make obvious the element of creating a library of calculated trace profiles. The Examiner relies on *Kotani* to provide a database of wafer tests results. The Examiner also relies on *Kleinknecht*, which does not disclose calculating trace profiles of implant regions having varying implant profiles, to make obvious the element of creating a library of a plurality of calculated trace profiles. Therefore, even if one skilled in the art were to combine *Kleinknecht* and *Kotani*, the element of creating the library comprised of a plurality of calculated trace profiles of implant regions, would not be

anticipated or made obvious. Additionally, those skilled in the art would not combine the two prior art disclosures to make obvious this element.

*Kotani* is directed to a system for managing production of semiconductor devices. *See*, col. 1, lines 11-15. *Kotani* discloses that a typical production line is comprised of a plurality of production apparatus 11a and a plurality of inspection apparatus 11b. The production apparatus 11a performs various processes on successive semiconductor wafers, while the inspection apparatus 11b inspects partially finished products which have been prepared by the production apparatus. *See*, col. 1, lines 19-33. *Kotani* further notes that in a conventional production line, the production apparatus and the inspection apparatus are allowed to operate independently regardless of errors and malfunctions in the production apparatus and the inspection apparatus. *See*, col. 1, lines 61-66.

To alleviate such problems, *Kotani* discloses a system comprised of a central processing unit 12 which performs real-time, online control of the production apparatus and the inspection apparatus. *See*, col. 3, lines 18-20. The processing managing system disclosed in *Kotani* is comprised of three blocks. The first block 10 is a processing managing area, which manages the various processes performed by the production apparatus and the various inspections performed by the inspection apparatus. *See*, col. 3, lines 40-44. The second block 20 is a data accumulation area, which is connected to the process managing means 10. The data accumulation means 20 accumulates and stores various data which have been acquired over a long period of time, such as the results of processes or inspections conducted in the production line, data obtained through various tests conducted by an external evaluation system, and the like. *See*, col. 3, line 57 – col. 4, line 5. The data accumulation means 20 provides for reference to the accumulated data as well as for statistical computation using such data. The third block 20 of the system disclosed in

*Kotani* is a simulation area. The simulation means 30 simulates the operation or characteristics of the semiconductor devices produced by the semiconductor production line on the basis of the data stored in the data accumulation means 20. See, col. 4, lines 12-16. The simulation means 30 further determines optimum conditions for subsequent processes to be performed and delivers the data for those optimum conditions to the process managing means 10. See, col. 4, lines 16-19. The simulation means 30 can perform process simulations, device simulations, and circuit simulations. See, col. 4, lines 19-31.

At no point does *Kotani* disclose at least the step of providing a library comprised of a plurality of calculated trace profiles for implant regions having varying implant profiles. Such a limitation is simply not disclosed in *Kotani*. In fact, it is hard to understand how any of the disclosure of *Kotani* could be construed as a disclosure of this limitation. Thus, the Examiner's obviousness rejection of claim 1, based upon the combination of *Kleinknecht* and *Kotani*, was improper as the combination of such art lacks at least this limitation. Moreover, there is simply no suggestion in *Kleinknecht* or *Kotani* to modify these teachings so as to arrive at the invention defined by independent claim 1.

Regarding the motivation of combining *Kleinknecht* and *Kotani*, the Examiner relies on the disclosure in *Kotani*, which describes a system for managing conditions of successive processes that are carried out on a semiconductor wafer. See, col. 2, lines 15-17. In other words, the Examiner relies on the mere disclosure of managing production of semiconductor wafers as the supporting argument for combining the general description of a database containing wafer test results (*Kotani*) with the disclosure of depth profile relating to various wavelengths that are measured (*Kleinknecht*). The Examiner uses this rationale to make obvious the library comprising calculated trace profiles of implant regions having varying implant profiles. See,

lines 3-6 of page 4 of the Office Action dated April 5, 2005. However, those skilled in the art would not perform such modification to *Kleinknecht* and/or *Kotani* to make obvious the elements of claim 1. The Examiner offered no arguments or evidence to suggest the contrary. The Examiner relies on the term "statistical computations" of the data stored in the database of *Kotani* to read upon the term "calculating trace profiles" for implant regions using the discussion of depth profiles of *Kleinknecht*. In other words, the Examiner uses broad concept of managing the production of semiconductor wafers as motivation to combine depth profile using wavelength measurements to make obvious the element of providing a library comprised of a plurality of calculated trace profiles for implant regions. It is a far stretch using improper hindsight reasoning to use the general concept of managing production of semiconductor wafers for motivation to combine measurements of wavelengths with statistical computation of data stored in a database to make obvious the element of providing a library comprised of a plurality of calculated trace profiles. Simply because *Kleinknecht* and *Kotani* are generally directed to the field of semiconductor device manufacturing does not provide the sufficient motivation to combine various intricate components of each of the prior art to read upon the elements of claim 1 of the present invention. In other words, the Examiner is taking into account more than the knowledge which was within the level of all those skilled in the art at the time the claimed invention was made.

The Examiner uses knowledge gleaned from the Applicant's disclosure to reconstruct the argument for creating a library based upon a database disclosed in *Kotani*, with the disclosure of a depth profile from *Kleinknecht*. That is, the Examiner uses improper hindsight reasoning to provide the arguments to support contentions of obviousness of the claim element relating to a library comprising calculated trace profiles of implant regions. Therefore, *Kleinknecht*, *Kotani*,

or their combination, do not anticipate or make obvious all of the elements of claim 1 of the present invention. Accordingly claim 1 of the present invention is allowable.

Independent claim 1 of the present invention is allowable for at least the reasons cited herein. Dependent claims 2 and 4-7, which depend from claim 1, are also allowable for at least the reasons cited herein.

Claims 1,2, 4-7 & 16-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Campion* (U.S. Patent No. 6,151,119) in view of *Kotani* and further in view of *Kleinknecht*. Applicant respectfully traverses the Examiner's rejections.

The primary reference, *Campion*, issued on November 21, 2000, based on an application filed on December 19, 1997. The present application was filed on April 2, 2001. Thus, *Campion* might initially be considered as prior art to the present application under 35 U.S.C. § 102(a) or under 35 U.S.C. § 102(e). However, as shown more fully below, the *Campion* patent is not prior art to the present application under 35 U.S.C. § 102(a) nor is it prior art to the present application in the context of an obviousness determination.

The *Campion* patent is not prior art to the present application under 35 U.S.C. § 102(a). The *Campion* patent issued on November 21, 2000. The present application was filed on April 2, 2001. In the Response to Office Action Dated January 2, 2003, the Declarations of James Broc Stirton (the named inventor) and the undersigned were filed to establish priority of the present application over the Singh reference. Those declarations, which are hereby incorporated by reference, establish that, based on the issue date of the *Campion* patent, the *Campion* patent is not prior art to the present application under 35 U.S.C. § 102(a).

Moreover, in the context of a § 103 obviousness analysis, the *Campion* patent is not prior art to the present application as set forth in 35 U.S.C. § 103(c). According to MPEP § 706.02(I)(1), "effective November 29, 1999, subject matter which was prior art under former 35 U.S.C. 103 via 35 U.S.C. 102(e) is now disqualified as prior art against the claimed invention if that subject matter of the claimed invention 'were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.'" The present application was filed on or after November 29, 1999. Furthermore, the present application and the *Campion* patent were, at the time the present invention was made, owned by the same entity or subject to an obligation of assignment to the same entity, namely Advanced Micro Devices. Thus, Applicant respectfully submits that the *Campion* patent is not available as prior art in any obviousness determination.

Additionally, Applicants had previously asserted that *Campion* is not prior art under 35 U.S.C. § 102(a) and that in the context of a § 103 obviousness analysis, the *Campion* patent is not prior art to the present application as set forth in 35 U.S.C. § 103(c) (*see*, Response to Office Action dated June 11, 2003). Subsequently, the Examiner did not object to Applicants arguments regarding *Campion* in the following Office Action (*see*, Office Action dated December 15, 2003). Therefore Applicants believe that the Examiner acquiesced to Applicants' arguments that *Campion* is not prior art under 35 U.S.C. § 102(a) and that in the context of a § 103 obviousness analysis, *Campion* is not prior art to the present application as set forth in 35 U.S.C. § 103(c). Thus, Applicant respectfully submits that the *Campion* patent is not available as prior art in any obviousness determination. Accordingly, this rejection is now moot.

Further, it is respectfully submitted that even if *Campion* were to be admitted as prior art, all of the elements of independent claims 1, 16, and 24 would not be taught or made obvious by *Campion*, *Kleinknecht*, and/or *Kotani*.

Independent claims 1, 16, and 24 of the present invention are allowable for at least the reasons cited herein. Dependent claims 2 and 4-7; 17-23; and 25-30 and claims 17-30, which respectively depend from claims 1, 16, and 24, are also allowable for at least the reasons cited herein.

The Examiner rejected claims 8, 11, 13-15, 31, 34, 36, and 37 under 35 U.S.C. 103(a) as being unpatentable over *Campion* in view of *Kleinknecht*. Applicant respectfully traverses the Examiner's rejections.

Again, as described above *Campion* is simply not available as prior art for an obviousness rejection. Therefore 8, 11, 13-15, 31, 34, 36, and 37 are allowable. Further, it is respectfully submitted that even if *Campion* were to be admitted as prior art, all of the elements of independent claims 1 and 6 would not be taught or made obvious by *Campion*, *Kleinknecht*, and/or *Kotani*.

Independent claims 8 and 31 of the present invention are allowable for at least the reasons cited herein. Dependent claims 9-15 and 32-37, which respectively depend from claims 8 and 31, are also allowable for at least the reasons cited herein.

Reconsideration of the present application is respectfully requested.

In view of the foregoing, it is respectfully submitted that all pending claims are in condition for immediate allowance. The Examiner is invited to contact the undersigned


attorney at (713) 934-4069 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,

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